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Evaluation of changes in myocardial mechanics in children during treatment of Malignant Hypertension

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The aims of this study were to evaluate the influence of malignant hypertension (MHT) on left ventricular mass and mechanics using advanced echocardiographic techniques. Material and methods: Children with MHT ≤ 16 years of age were identified. Left ventricular assessment was performed retrospectively using M-mode and two-dimensional echocardiography (2DE), in addition to 2D and 3D speckle tracking echocardiography (STE). Hypertension was defined according to the Fourth Report of the National Blood Pressure Education Program. LV mass (LVM) was calculated by Devereux formula and indexed to height ($\text{g}/\text{m}^2.7$). Left ventricular hypertrophy (LVH) was defined as indexed LVM (LVMI) for height z-scores $> 1.64\text{SD}$. Results: 37 patients (age 9 ± 6 years) with mean glomerular filtration rate ($82.11 \pm 34.9 \text{ ml}/\text{min}/1.73\text{m}^2$) and mean SBP z-scores (6.25 ± 2.82), showed abnormal LVM and mechanics at presentation. The mean LVMI z-score was 2.1 ± 2.4 , with 22 patients (62%) exhibiting LVH at presentation. There were significant changes for 2DSTE longitudinal strain (LS) (-14.82 ± 4.2 vs. -20.74 ± 2.8 , %; $p < 0.001$) and circumferential strain (CS) (-13.74 ± 5.5 vs. -20.65 ± 5.2 , %; $p < 0.001$) between baseline and last visit. Similarly, significant changes were observed in 3DSTE LS ($p = 0.002$), CS ($p = 0.020$) and radial strain (RS) ($p = 0.004$). LVMI z-scores showed significant reduction (2.1 ± 2.4 vs. 0.1 ± 2.1 ; $p < 0.001$) over time. These changes though were not related to extent of reduction in the blood pressure despite relatively strong positive association ($r^2 = .6$; $p = 0.65$). Conclusions: Abnormal indices of LV mass and mechanics are evident in children with MHT with changes reversible on management of blood pressure. It is possible that other factors such as class of anti-hypertensive agent have an impact on LVM and deformation beyond reduction of blood pressure alone.

Biography

Sahar Alborikan is a postgraduate clinical researcher and she has completed her MSc at the age of 26 from King's College of London and she is currently a PhD student at William Harvey Institute, Queen Mary University of London in the area of adult congenital heart disease. She is a senior Cardiac Technology Specialist at King Fahad Specialist Hospital, Dammam Saudi Arabia. Her main research interest is advanced echocardiographic techniques in adult and paediatric.

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